REMARKS

Claims 5 to 7 as set forth in Appendix I of this paper are now pending in this case.

Claims 5 to 7 have been amended as indicated to bring out the meaning of *"large"* in accordance with applicants' disclosure on page 3, indicated lines 7 and 8, of the application. No new matter has been added.

The Examiner indicated that Claims 1 to 8 were deemed to be pending, and remarked that a cross-reference to the parent application was necessary to claim its benefit under Section 120. Applicants herewith enclose a copy of the Preliminary Amendment which was submitted by applicants upon filing of the current divisional application. Accordingly, the application was amended to include the requisite cross-reference on page 1 after the title, Claims 1 to 4 and 8 were canceled, and Claims 5 and 7 were amended. In light of the foregoing and the attached it is respectfully requested that

- the objection to the specification for lack of an appropriate cross-reference,
- the rejection of Claim 8 under 35 U.S.C. §101,
- the rejection of Claims 1 to 4 and 8 under 35 U.S.C. §112, ¶2,
- the rejection of Claims 1 to 3 and 8 under 35 U.S.C. §102(e) based on the teaching of ***Hata et al.*** **(US 6,391,412)**, and
- the rejection of Claim 4 under 35 U.S.C. §103(a) based on the teaching of ***Hata et al.*** **(US 6,391,412)**,

be withdrawn.

The Examiner rejected Claims 5 to 7 under 35 U.S.C. §112, ¶2, finding that the reference to *"large"* blow moldings renders the claimed subject matter indefinite. Favorable reconsideration of the Examiner's position and withdrawal of the respective rejection is respectfully solicited in light of applicants' clarification in Claim 5 that the large blow moldings have a volume of from 5 to 5,000 l.

The Examiner rejected Claims 5 to 7 under 35 U.S.C. §103(a) as being unpatentable in light of the teaching of ***Hata et al.*** **(US 6,391,412)** when taken in view of the prior art concerning the annealing of small blow moldings made from polyethylene which is addressed on page 2 of the application.

Applicants' invention as defined in Claim 5 and further specified in Claims 6 and 7 relates to a process in which blow moldings such as canisters, tanks, drums and intermediate bulk containers which have a

volume of from 5 to 5,000 l are formed. The respective large blow moldings are specifically adapted for the storage and the transport of hazardous materials due to the fact that they have a bursting strength, determined by a drop test at -18°C, of more than 3m[1)], cf. the blow moldings obtained in accordance with applicants' process, when they are filled with a test liquid, withstand a fall from a height of 3 m at a temperature of -18°C[2)].

As acknowledged by the Examiner and addressed on page 2 of the application[3)], it is known in the art that the stiffness and the stress-crack resistance of a small blow molding made from polyethylene is increased when the blow molding is subjected to annealing, cf. the blow molding is subjected to a post-treatment with heat. It is, however, also known in the art that a post-treatment with heat can cause a plastic to become brittle due to an increase in the stiffness, the density, and the degree of crystallization of the plastic[4)].

Hata et al. disclose a fuel tank having a multi-layer construction of

(a) an inner and outer layer of high-density polyethylene (HDPE),

(b) intermediate layers of adhesive resin such as polyurethane adhesives, polyester adhesives or copolymers of ethylene and an unsaturated carboxylic acid or anhydride[5)], and

(c) a core layer of ethylene-vinylalcohol copolymer (EVOH),

wherein particular impact resistance and particular barrier properties are achieved due to the fact that the thickness of the EVOH layer satisfies the formula: $0.005 \leqq A/B \leqq 0.13$, wherein A represents the thickness of the EVOH layer and B represents the total thickness of all layers. The Examiner takes the position that it would have been obvious to one of ordinary skill in the art to subject the tanks taught by ***Hata et al.*** to an annealing step since it was known that such an annealing step improves the stiffness and the stress-cracking resistance of polyethylene blow moldings. Favorable reconsideration of the Examiner's position is respectfully solicited.

The tanks of ***Hata et al.*** not only comprise HDPE layers (a) but also comprise layers of the adhesive (b) and of EVOH (c). A person of

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1) For example page 1, indicated lines 5 to 14, of the application.

2) For example page 1, indicated line 33, to page 2, indicated line 8, of the application.

3) Cf. page 2, indicated lines 17 to 31, of the application.

4) For example page 2, indicated lines 10 to 15, of the application.

5) For example col. 5, indicated lines 30 to 48, of ***US 6,391,412***.

ordinary skill in the art could not reasonably expect that the stiffening effect which is observed when polyethylene is subjected to annealing would equally be observed when the adhesive resin(s) and/or the EVOH polymer of ***Hata et al.***'s tank are subjected to annealing. Rather, in light of the knowledge that the adhesives as well as EVOH comprise reactive groups, a person of ordinary skill would reasonably expect that the adhesive layers and the EVOH layer(s) become brittle when they are exposed to a post-treatment with heat, and that those layers would be rendered unsuitable to perform their intended function if the tank of ***Hata et al.*** is subjected to an annealing step. Accordingly, a person of ordinary skill in the art would not have been motivated to subject the tank disclosed by ***Hata et al.*** to an annealing step[6]. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and cannot be based on the applicant's disclosure[7]. Such a teaching or suggestion is, in light of the foregoing, clearly lacking from the teaching of ***Hata et al.*** and from the references addressed in applicants' disclosure which relate to the effects of annealing on polyethylene bow moldings. The teaching of ***Hata et al.*** when taken in view of the prior art concerning the annealing of small blow moldings which is addressed on page 2 of the application is therefore not deemed to render applicants' process obvious within the meaning of Section 103(a).

It is further respectfully submitted that applicants' process specifically aims at improving the breaking strength or bursting strength of large blow moldings having a volume of from 5 to 5,000 l. As addressed in the foregoing, it was known in the art at the time applicants' made their invention that it was possible to improve the stiffness and the stress-cracking resistance of small blow moldings made from polyethylene by annealing. It was, however, also known that a post-treatment with heat not only increased in the stiffness and the density, but also the degree of crystallization of the plastic and therefore can cause a plastic to become more brittle[8]. Based on the knowledge which was available at the time applicants' made their

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6) There is no suggestion or motivation to make a proposed modification if the proposed modification would render the prior art invention which is being modified unsatisfactory for its intended purpose (In re Gordon, 733 F.2d 900, 221 USPQ 1125 (CAFC 1984)).

7) In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (CAFC 1991).

8) For an overview of the varying effects underlying fracture of plastics please note the attached copy of ***Ullmann's Encyclopedia of Industrial Chemistry***, Vol. A20, 5th Ed., VCH Verlagsgesellschaft mbH, Weinheim 1992, pages 634-638.

invention it could, therefore, not reasonably be expected that annealing a blow molding made from a polyethylene having a density $\rho \geq 0.94$ g/cm^3, a melt flow rate MFR 190/21.6 < 50 g/10 min and a notched tensile impact strength a_{zK} (-30°C) not less than 250 kJ/m^2, at a temperature of from 60 to 135°C until the notched tensile impact strength a_{zK} (-30°C), measured in accordance with ISO 8256, is at least 300 kJ/m^2, would provide for an improvement of the breaking strength of the blow molding.

In light of the foregoing and the attached it is respectfully requested that the rejection of Claims 5 to 7 under Section 103(a) based on the teaching of ***Hata et al.*** and the prior art addressed on page 2 of the application be withdrawn. Favorable action is solicited.

REQUEST FOR EXTENSION OF TIME:

It is respectfully requested that a *one* month extension of time be granted in this case. A check for the *$110.00* fee is attached.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 11.0345. Please credit any excess fees to such deposit account.

Respectfully submitted,
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Encl.: THE LISTING OF CLAIMS (Appendix I)
Copy of Preliminary Amendment
Ullmann's *Encyclopedia of Industrial Chemistry*, Vol. A20, 5th Ed., VCH Verlagsgesellschaft mbH, Weinheim 1992, pp. 634-638

HBK/BAS

APPENDIX I:

THE LISTING OF CLAIMS:

1. (*canceled*)

2. (*canceled*)

3. (*canceled*)

4. (*canceled*)

5. (*currently amended*) A process for producing a large polyethylene blow ~~moldings~~ molding having a volume of from 5 to 5,000 l and having a bursting strength determined by a drop height test at ~~18°C~~ -18°C of more than 3 m, by forming polyethylene ~~of~~ having a density $\rho \geq 0.94$ g/cm^3, ~~of~~ a melt flow rate MFR 190/21.6 < 50 g/10 min and ~~of~~ a notched tensile impact strength a_{zK} (-30°C) not less than 250 kJ/m^2, at high temperatures to give a large blow molding having a volume of from 5 to 5,000 l, and allowing the ~~large~~ blow molding to cool to room temperature, and, in a further step, annealing the ~~large~~ blow molding at from 60 to 135°C until the notched tensile impact strength a_{zK} (-30°C), measured in accordance with ISO 8256, is at least 300 kJ/m^2, and then cooling the same again to room temperature.

6. (*currently amended*) A process as claimed in claim 5, wherein the polyethylene ~~used~~ has a weight-average molar mass M_w of from 200 to 800 kg/mol and a breadth of molar mass distribution M_w/M_n of from 5 to 80.

7. (*currently amended*) A process as claimed in claim 5, wherein the ~~large~~ blow molding is formed by extrusion molding.

8. (*canceled*)